Rocks and Minerals

PUBLISHED MONTHLY

Edited and Published by PETER ZODAC

October 1940

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Entered as second-class matter September 13, 1926, at the Post Office at Peekskill, N. Y., under the Act of March 3, 1879.

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Specially written articles (as contributions) are desired.

Subscription price $2.00 a year; Current numbers, 25c a copy. No responsibility is assumed for subscriptions paid to agents and it is best to remit direct to the Publisher.

Issued on the 1st day of each month.

Authors alone are responsible for statement made and opinions expressed in their respective articles.

ROCKS and MINERALS PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

Chips From The Quarry

LABEL SPECIMENS ON DISPLAY

During the past few years it was our good fortune to call upon a large number of collectors where we were privileged to examine their mineral collections. In most cases the collections were of very poor quality about which we have already commented in past issues of ROCKS AND MINERALS. Nevertheless if the specimens were from localities new to us we received some pleasure in examining them.

There were quite a number of collections which were remarkable for the large number of very choice specimens that were outstanding for the excellence of quality and brilliancy of coloring. A visiting collector could spend many enjoyable hours in examining any one of these fine collections. In some instances, however, a few of these fine collections were very discouraging to us because labels did not accompany the minerals on display. We knew the reason. The displays were so overcrowded with specimens that there was no room for labels. We also knew that each specimen carried a number and was recorded in a diary. Even though in every case the collector was only too willing to look up the name and locality of any specimen in which we were interested, we hesitated in asking him to do this as it would mean looking up every mineral on display. We do not like to put our hosts to any unnecessary trouble and so would refrain from asking them to look up any information for us except in one or two instances. In such cases we would take leave of our host with a great deal of regret but always with the hope that some day we would return and see what was apparently denied us then.

We have compared notes with other collectors and were gratified to learn that they concur with us in this matter. Many who have been a little careless themselves, when their attention was called to it, have improved on the labeling of their displayed specimens.

There are a number of ways in which minerals can be labeled for the convenience of visitors if a cabinet is overcrowded. Take out a few specimens or else use small labels. Another method is to have the number of the specimen in plain view. Then a typed tabulated list of the specimens on display with their localities and arranged numerically should be hung nearby.

Whatever method a collector may adopt to label his displayed specimens we care not so long as a visitor may learn with some ease and convenience what they are and where they come from.

Peter Zodac

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PUBLISHED MONTHLY

Edited and Published by PETER ZODAC

October 1940

Vol. 15, No. 10

The Official Journal of the ROCKS and MINERALS ASSOCIATION

Whole No. 111

NEW LOCALITIES IN WESTCHESTER COUNTY, N. Y.

By EVELYN WAITE

Crestwood, N. Y.

One day in the spring of 1937, a year or so after the writer had become interested in the collecting of minerals, a young boy of the neighborhood, who was looking over some of her specimens, complained that he wouldn't have a chance to make much of a collection as he never went anywhere where fine minerals could be found. Where upon it was suggested that he ride his bike up to Cecil Park, a neighboring settlement, where some dumping had begun following the opening of Shaft No. 22 of the Delaware Water Project by the City of New York.

In a few days a very enthusiastic boy returned with a good sized box of specimens to show for his first collecting trip. Much to the writer's surprise, he had some very pretty and showy specimens of pyrite crystals in various forms, in calcite and in mica schist, some purplish and dark red garnets, and a number of less showy material. The pyrite clusters and crystals in schist were especially attractive and worthy of any collection.

Immediately it was decided that we had been very slow, ourselves, in examing our home territory so the next day we set out to try our luck. But alas, the sharp eyes of our young friend had apparently "skinned" the dump (which was small at the time) as we found but a few specimens not one of which was attractive or showy as his were. And though we have since visited the locality many times, the dump now covering several acres of ground, we have yet to beat or even match his specimens. However the dump is still an interesting spot to visit and many hours have we spent in poking about, much to the amusement and interest of passers-by and nearby residents. One day a woman came over and asked if gold had really been found there as she had heard that a small boy had found some. We told her that the only yellow mineral to be found here was pyrite (fool's gold) and showed her specimens of it.

On one of our last visits to this locality in June, 1939, we found a few pieces of a slightly crystallized calcite, pure white in color. The largest specimen, on biotite gneiss, contained pyrite in a new and very attractive form, in sheaf-like bundles standing vertically in the calcite and showing a brilliant cut-effect on the surface. The largest of these bundles measured about an inch across the top which was rounded like a pin-cushion and resembling somewhat a marcasite cluster with its iridescent sparkle due to its many tiny faces when exposed to the light. Altogether we found perhaps a dozen of these clusters, most of them ½ inch or less in diameter. A fine layer of a granular type of iridescent pyrite, of somewhat irregular width, was present at the base of the calcite, apparently where it joined the rock mass.

Among the minerals which we have

Editor's Note: The author is sponsor of "The Chiselers," a mineral club composed of young girls and in this delightful little article she tells of some of the interesting finds made near her home in which some of the young collectors participated.

Crestwood is near Tuckahoe, in lower Westchester County.

identified from this locality (Cecil Park dump of Shaft No. 22) are:

Amphibole, var. Hornblende.

Apatite xls.

Biotite, black flakes.

Calcite, white, yellowish, gray; massive and crystals.

Cyanite, blue, on gneiss.

Feldspar, white, gray, pink, orange, yellow; some transparent.

Garnets of varying sizes, mostly deep red in color.

Hematite, red stains on rocks.

Limonite, brown stains on rocks; also pseudomorphs after pyrite xls.

Muscovite, white, also green.

Pyrite, massive, granular, xled and in xls.

Pyroxene.

Quartz, smoky, milky, clear, pink and amethystine.

Tourmaline, black, imperfect xls.

From the above dump we next found our way to the one at Orchard Hill in Elmsford, between Routes 100 and 100A, where a triangular piece of swamp land was being filled in from nearby Shaft No. 20. This spot we have visited many times and always found something of interest. One of our first big finds here was a generous group of pyrite crystals of fair size on a 14 x 7 inch slab of biotite-gneiss. This find encouraged us to make frequent visits to the locality till bad weathered prevented it though cold did not.

Here we also found lovely little cubes and barrel-shaped crystals of pyrite on clear, white crystals of calcite of many different sizes, from tiny bubbly clusters to clusters of crystals as large as eggs or walnuts. The prettiest specimens were those on the calcite crystals, about the size of green peas, and quite a number of these were found. The largest calcite crystals were found by Mrs. Geo. Iffla, of Bronxville, N. Y., and the writer, in a boulder that was too large for us to move. When we came back with a chisel, a few days later, we accidently dislodged the boulder and it rolled down into the mucky water and was lost.

Most of the calcite crystals found at Orchard Hill were imbedded in a green and white dolomite of which there seemed to be considerable, and they were crosswise to the grain which made the crystals very difficult to remove whole. Some of the clear calcite proved to be Iceland spar, though in small sections but clearly showing double refraction.

Another find here was of a yellowish calcite, in veins an inch or more thick, some showing definite crystal faces, and all fluorescing an attractive rose-pink under the argon bulb.

There was plenty of serpentine here, in fact much of it resembled the material from the Tilly Foster Iron Mine, near Brewster, N. Y., with its blue, green, and white shiny coatings. Some of the serpentine contained many deep-red garnets though not in as much quantity as we later found at Valhalla.

My sister-in-law, Mrs. R. T. Waite, found one specimen of gneiss that was coated heavily with sky-blue azurite mixed with a little greenish malachite but try as we would only one more specimen could be found and it was small and had only malachite. Another mineral, of which only one specimen was found, was black tourmaline in good size though shattered crystals.

The "Chiselers", of Crestwood, N. Y., have many attractive specimens from this locality which is now practically lost to us by being smoothed over though it may still have possibilities for sharp eyes.

At the dumps from Shaft No. 17, on old Rye Lake, near Kensico, we have not found as large nor as interesting a variety of specimens as at the two already mentioned. The best find made here, by one of the younger members of the "chiselers", was a single specimen of crystallized sphalerite, the only specimen of this mineral found by any of us in this area.

At the dumps from Shaft No. 18, at Valhalla, near the fountains, we found a regular collector's Paradise, though a very windy and chilly one on cold wintry days. During one of our first visits to the locality we discovered fairly good specimens of molybdenite as flakes and stringers in pegmatite. Mr. Zodac, our Editor, being especially interested in

molybdenite, made a trip down from Peekskill on a cold and blustery day in February, 1938, to verify our find and to collect a few specimens. He very kindly helped us to identify some of our finds. Among the minerals found here were:

Apatite, green xls, also a few white ones in pegmatite.

Biotite, common as small black flakes, in gneiss and mica schist.

Chlorite, greenish foliated masses in pegmatite.

Dumortierite, in slendor bluish fibrous masses in pegmatite.

Fluorite, small purplish slender crystal aggregates in pegmatite.

Garnets, very common as small crystals and rounded grains (all dark red in color) in pegmatite; and in mica schist.

Graphite, small black flakes in quartz.

Ilmenite, occurs sparingly as thin black plates in milky quartz.

Molybdenite, flakes and stringers in pegmatite.

Muscovite var.Sericite, rather common as small pearly flakes in pegmatite.

Pyroxene.

Quartz, milky and smoky, massive.

Serpentine, common as small greenish masses.

Tourmaline, black crystals in pegmatite.

At the dumps from Shaft No. 19, near Eastview, which we visited on April 14, 1939, we found much attractive pink and banded (pink, white, gray, green and yellow) dolomite, green feldspar, small quantities of serpentine, small pyrite crystals and massive milky quartz. On November 11, 1939, one nice specimen of serpentine asbestus was found by Jane Everett, of Crestwood, Black tourmaline crystals and some red garnet crystals were also found.

On March 21, 1938, we visited the dumps on the north side of Yonkers Ave., near Kimball Ave., in Yonkers, which are now covered over with a group of attractive little homes. Here we found very pink gneiss and the usual run of pegmatite minerals as well as some very dark-green soapstone containing small but perfect cubes of pyrite, also some brownish cyanite-schist, a little amethystine quartz in gneiss, fluorescent calcite in masses and veins and one specimen of botryoidal calcite resembling prehnite in form and appearance We also found quite a bit of peristerite, a variety of albite, with definite flashes of blue and iridescent color.

On Saturday, June 3, 1939, several members of the "Chiselers", accompanied by Messrs. Doherty and Zodac, of Peekskill, and the writer, paid a short visit to the dumps from Shaft No. 23, located on Palmer Ave., Bronxville. Much banded gneiss was in evidence and a few pieces of white, crystallized calcite. The find of the day was a good specimen of molybdenite (found by Jane Lind of Crestwood), the only specimen of the mineral found on that trip or on subsequent ones.

Altogether these dumps have proved both a source of inspiration and enjoyment to ourselves and to our friends, those who are young and those not so young, and of real educational value besides. It is also possible that other "finds" may still be made if one is diligent in his search and has the time to spend. Certainly it was a grand opportunity for our group of young enthusiasts to have such good hunting grounds so comparatively near home and we are sure they did much towards fanning the growing flames of their enthusiasm for their new hobby and it is hoped that these fires do not have a chance to die out but will carry them on to greater interest as they grow in years and in knowledge.

SANIDINE OR LABRADORITE?

By RONALD L. IVES
Vice-President, Rocks and Minerals Association

During recent field investigations in Trans-Pecos Texas, a number of beautiful iridescent crystals were found in an igneous matrix. The appearance of these crystals suggested that they might be labradorite, a conclusion supported by rough field tests, and by numerous reported finds of labradorite in adjacent parts of the Davis Mountain region.

Later, when the report was in preparation, a number of discrepancies appeared. The country rock, locally classified as basalt, and given the field classification *basalt (?) porphyry,* turned out to be a typical felsite porphyry, in which the occurrence of labradorite would be unusual, to say the least.

Megascopic methods failing to give satisfactory answers, the co-operation of Dr. E. E. Wahlstrom, of the University of Colorado, was enlisted; thin sections of the specimens were made and studied under a microscope; and the country rock found to be sanidine porphyry (which should carry a field classification of syenite porphyry). The supposed labradorite was conspicuous by its absence, and the labradorescent crystals turned out to be large phenocrysts of sanidine.

Discussion of this sanidine—labradorite confusion disclosed that the two minerals cannot ordinarily be distinguished by the usual field tests, and that many so-called labradorite specimens in private collections are probably sanidine.

Review of the properties of these two minerals shows that the confusion between them is perfectly understandable, particularly when the specimens are small or present as phenocrysts in porphyry, but also indicates several criteria by which they can be distinguished.

The physical properties of the two minerals, given below, show quite c'early how easily they may be confused, even when the usual field tests are carefully applied.

PHYSICAL PROPERTIES

	Sanidine	Labradorite
Color	Transparent, white, gray often opalescent or iridescent.	Transparent to nearly opaque, often opalescent or "labradorescent"
Luster	Vitreous to pearly	Vitreous to pearly
Streak	White to light gray	White to light gray
Hardness	6	6 - 6.5
Specific Gravity	2.5 - 2.6	2.7
Fracture	Conchoidal to uneven	Conchoidal to uneven

OCCURRENCE

Sandine	Labradorite
In eruptive igneous rocks, especially rhyolite, trachyte, and phonolite.	In basic igneous rocks, especially norite, basalt, diabase and andesine.
"Labradorescent" specimens larger than ½" in diameter practically unknown.	Large specimens not uncommon in some localities.

Occurrences of the two minerals differ enough so that if a specimen is found "in place", its probable classification may be determined by inspection of the country rock.

From its occurrence, it may be inferred that any large specimen found in a basic matrix (usually dark-colored) is probably labradorite: a small specimen found in a dark matrix may be either labradorite or sanidine: a small specimen in a light-colored matrix is almost certainly sanidine.

Crystalline structure furnishes evidence for definite identification, but its determination, in small specimens, is usually quite difficult, unless thin sections are made and studied under a petrographic microscope.

Labradorite crystallizes in the pinacoidal class of the triclinic system, with twinning similar to that of albite (albite and pericline laws), and has perfect basal and brachypinacoidal cleavages inclined at 86° 26'.

Sanidine crystallizes in the prismatic class of the monoclinic system, with Karlsbad twinning so common as to be almost characteristic; has perfect basal and good clinopinacoidal cleavages, making an angle of 90°.

Where the individual crystals are large and perfect enough for determination of the system, the angles between cleavages, or the dominant type of twinning, the mineral can be classified with little doubt. In many instances, however, particularly when dealing with commercial minerals, rather than "collectors' items", the feldspars are present as phenocrysts in porphyries, the crystals are both imperfect and distorted, and megascopic inspection is as nonindicative as hardness and streak tests.

Both minerals are members of isomorphous series, having similar chemical formulae. These are:—

LABRADORITE $NaAlSi_3O_8.CaAl_2Si_2O_8$ in which the first member (albite) forms from 50 to 30 percent, and the second member (anorthite) the remainder.

SANIDINE $(K,Na)AlSi_3O_8$ in which the ratio of potassium to sodium is somewhat indefinite, with potassium definitely predominating.

From these formulae it is obvious that the only constituents not common to both minerals are calcium and potassium, and that any test indicating which of these elements is present will automatically tell whether the specimen is labradorite or sanidine.

If a small amount of the suspected material is finely crushed with about an equal amount of gypsum, and inserted into a nonluminous flame on a clean platinum wire, the flame will be colored brilliant yellow. This indicates the presence of sodium, which is common to both minerals.

By viewing the colored flame through a blue glass, the almost monochromatic sodium yellow is filtered out, and the flame coloration due to other materials passes through.

Potassium, indicative of sanidine, colors the flame violet. A substantially identical flame coloration, useful for comparison purpose, is produced by heating an orthoclase-gypsum mixture in the flame.

Calcium, indicative of labradorite, colors the flame orange-red. A substantially identical flame coloration, for use as a standard, is produced by heating an anorthite-gypsum mixture in the flame.

Use of a blue glass filter, and of known minerals as standards, eliminates many errors, and tends to cancel out most of the troubles due to individual differences in color vision.

Although these criteria — association, crystalline structure, and chemical content—are satisfactory for most purposes, they fail completely when orthoclase, albite, and anorthite are intimitely associated. In this case, which is uncommon, but not unknown, only detailed petrographic study, usually accompanied by quantitative chemical analysis, will give a correct answer.

Investigation of the fluorescent properties of sanidine and labradorite has not produced wholly consistent results to date, and offers an interesting field for further research.

SILICIFIED BONES FROM AN INDIAN GRAVEYARD

By WALTER S. AMOS
Winchester, Virginia

In mid-August, 1940, I visited an Indian burial ground in West Virginia; on this trip Dr. A. C. Hawkins, mineralogist, accompanied me. The graves are located in the southern river-bank of the South Branch of the Potomac River, 7 miles north of Romney, West Virginia, on property owned by a farmer named Mr. Harris. This spot is accessible only by way of a narrow road which goes northeast from the little bridge at the west end of the Gap on U. S. Highway 50 west of Romney, or by boat across the river west of the Hanging Rocks on Route 28 north of Romney.

The stream-bank is here a terrace some 15 feet high, whose face the stream is actively cutting, exposing 12 feet of brown loam in the top portion, under which is a hardpan layer composed of sand cemented by limonite, with a thick underlying local lens of gray clay and sand in which there are large logs of partially lignitic wood which shows considerable age. The graves which are exposed are at a depth of about 3 feet below the top of the terrace; each of the opening is now about 2 feet wide and 6 or 8 inches deep.

About two-thirds of them contain human bones lying horizontally. The bones are very thin-walled and fragile, suggesting a lack of something essential to bone formation in the savages' diet. There are few artifacts or other objects with these bones, so far as was observed. The other one-third of the graves, all in the eastern part of the burial area, are without bones, but are filled with fresh-looking black charcoal, interspersed with sandstone riverstones each 6 or 8 inches in diameter. It is very likely that cremation on a bed of live coals and hot rocks was resorted to in these cases, perhaps because the victims had died of some plague. According to the observations of people who have excavated some of the burials, some of the Indians were buried at full length, and at least one spread-eagled with a string of beads underneath his hand; and others were doubled up with knees under the chin and the hands before the face. The graves are regularly spaced horizontally at a distance of about 12 feet apart, and were laid out in a semicircular pattern which is estimated to have covered about 2½ acres, 1/3 of which has been removed by river erosion.

One of the bones shows a ⅛ inch layer of hard black material replacing the filling between thin walls of light colored, softer bone. This is proven by chemical and microscopic tests to be silica. The bone is, therefore, well advanced in the process of fossilization and must represent a burial which is at least several hundred years old. There is evidence of two distinct Indian cultures here; an earlier tribe employing beads made of flat river pebbles drilled through the middle, and crude stone tools; and a later one with beads of blue porcelain, marked with lighter colored watermelon streaks, and iron axe-heads; all of which were very evidently obtained by trading with white settlers.

Skulls have been recovered; also pottery of early types made by hand, and of later types molded inside baskets. Celts and arrowheads of the later type are of fine workmanship. A few copper beads have been found, which were made by bending a small copper plate to form a tube; and a small copper blade. There are grooved stone axe-heads also, one bead made of oyster-shell, and numerous arrow-heads of all degrees of perfection, and of many different kinds of material.

This locality seems well worth careful scientific investigation.

THE MIOCENE EXPOSURES IN TIDEWATER VIRGINIA

By GEORGE C. BARCLAY

Twenty million years ago, or during the Miocene period, the present sea coast extended inland in Virginia to where Richmond now is. A line drawn through Washington, D. C., Fredericksburg, Va., Richmond, Va., Petersburg, Va., and Weldon, N. C., would give the probable Miocene Sea Coast.

From these places East, where rivers have cut the later deposits, the upper members of the Miocene are exposed. These different horizons are abundant in marine shells, whale bone, shark teeth, etc.

Throughout the entire belt, however, those exposures along the York River, at and near Yorktown, Va., and on the East bank of the James River five miles south of Williamsburg, are the most interesting, as well as containing the greater variety of the Miocene marine fauna.

Not only is this true, but the fossils are remarkably well preserved, both the interior and exterior features of the shell retaining their original forms and markings. This is particularly true where the shells have been embedded in the loose coquina or sand matrix. Where clay matrix predominates the shells are soft, fragile and rotten, though if taken out carefully and allowed to dry they can be handled, but for collection purposes such specimens should be coated with shellac in order to protect them.

One of the outstanding features of the deposit is that shells of a kind are grouped together. That is, the Pecten Jeffersonius, tho very like the Pecten Madisonius, will be found in one spot with no sign of the other Pectens. This holds true of all the other shell fossils. For instance, the great bank exposure at the Moore House beach, about a mile south-west of Yorktown, contains thousands upon thousands of the Cripidula fornicata with scarcely no other species except in the lower strata of the formation and there the Dosina acetabulum predominates.

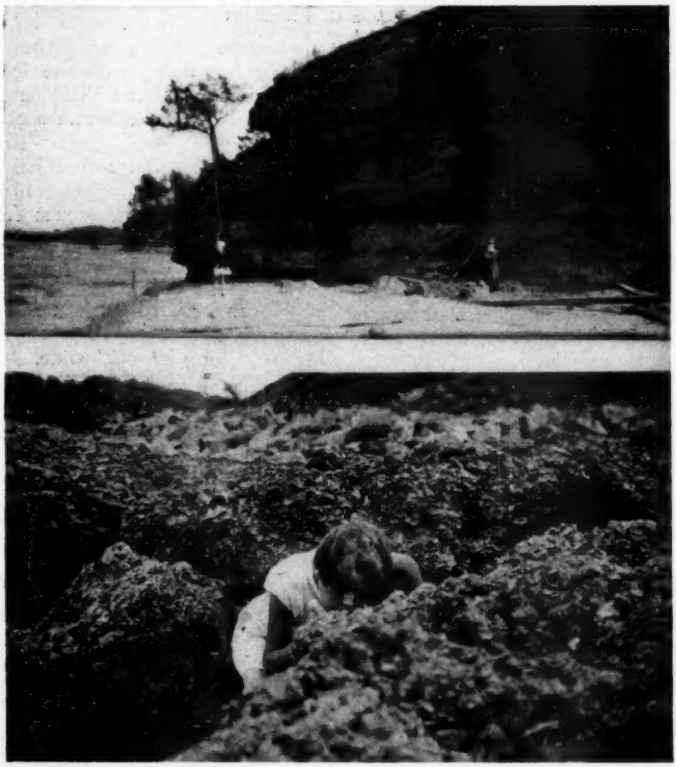
This holds true also of the whale bone, the shark teeth, the Venus tridacnoides, the Fulgurs, etc. After one has become acquainted with the locality of these groups he has no trouble going to the spot to get that certain specimen he wishes.

The Yorktown exposure has been a very attractive spet to gather Miocene specimens. For years, groups from colleges, museums, etc. have trekked there to gather fossils.

Among the unusual specimens are the large carcharodon - shark teeth. Some teeth reach an astonishing size, measuring 5¼" long by 4½" wide.

Another unusual occurrence is the calcium carbonate crystal shell casts. The interior of the shells are filled with beautiful transparent crystals which are highly fluorescent under the violet ray. In some cases the outer shell or parts of it, still remain. In other cases the shell

The author's little girl, Suzanne, who is her daddy's "Pal" in his field work.
Crepidula fornicata exposure in background. Moore House, York River, Va.



Top. The Yorktown formation, ½ mile south of Yorktown, Va.

Bottom. Suzanne looking for calcium shell casts among the coquina blocks, York River, Va.

is entirely gone, leaving only this crystal cast. These casts, when polished, make most attractive specimens.

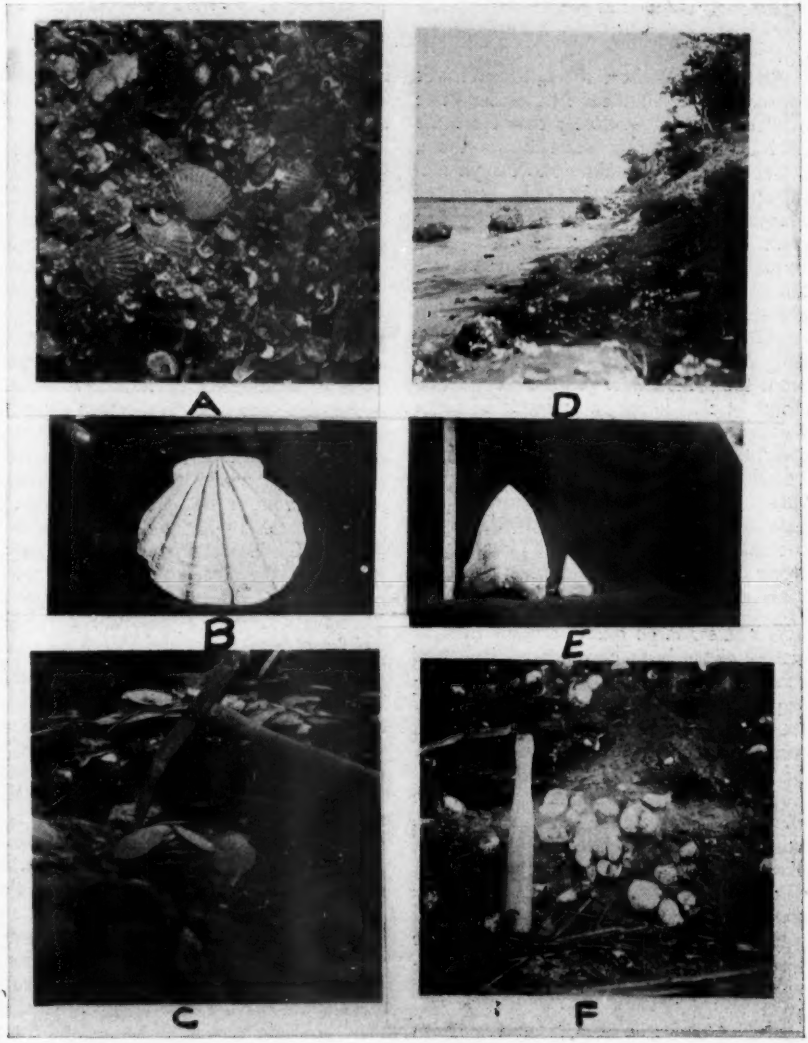
Among the more abundant fossils to be gathered with ease are the:

Pecten jeffersonius
Pecten madisonius
Pecten clintonius
Blanus concavus
Crepidula fornicata
Glycymeris subovata
Crepidula plana
Crepidula aculeata var.costata
Turritella alticostata
Venus tridacnoides
Ostrea disparilis
Balanus concavaus
Glycymeris americana

and several species of coral. Whale bone is abundant in places, numbers of small species of both the Gastropoda and Pelecyopoda. In addition, shark or fish vertebra, shark teeth, teeth of the toothed whale and other teeth belonging to marine animals, occur here.

It is said that over 130 different species can easily be collected. This seems to be true for one can gather for years and almost ever trip will reveal a new specimen. As a matter of fact, as the bank breaks down after storms, one is almost sure of adding new-comers to his collection.

(*Continued on page* 349)



A. Pecten madisonius exposure, 1½ miles southeast of Yorktown, York River, Va. (in place).

B. Pecten jeffersonius, 8 inches across.

C. Pecten clintonius exposure in the bank of Marine sand, 5 miles northwest of Yorktown, on York River, Va.

D. Broken down bank showing blocks of coquina along the beach, York River, above the Moore House, Va.

E. Huge carcharodon shark tooth, 5½ inches long. Normal shark tooth alongside. Penniman, 5 miles north of Yorktown, Va., on York River.

F. Group of Crepidula fornicata in the bank. Moore House exposure, York River, Va.

THE QUARTZ OF BERKELEY SPRINGS, WEST VIRGINIA

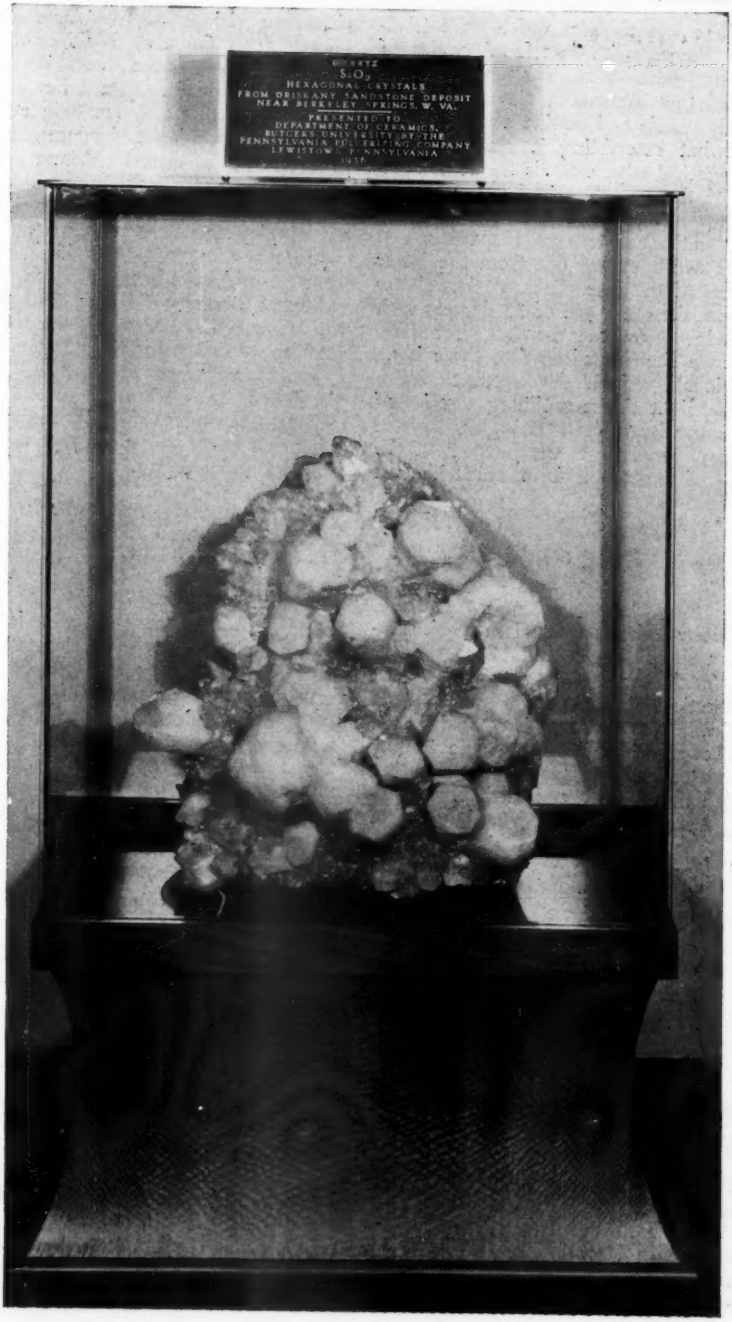
By DR. A. C. HAWKINS

At the point where the Potomac River approaches the southern line of the State of Pennsylvania so closely that the State of Maryland, which lies between them, is reduced in width almost to the vanishing point, you will find the town of Hancock. Six miles southwest of this place, along an excellent highway, in a country of beautiful valleys and mountains, at the village of Berkeley Springs, a State Park and health resort have been established in a locality where wonderfully clear streams of pure water emerge from the Oriskany sandstone. The sandstone itself forms a mountain ridge which extends in a general northeasterly direction from Berkeley Springs to the Potomac River opposite Hancock; in the ridge there are several quarries which have been opened at various times for the mining of the steeply-dipping sandstone strata, which are crushed to make glass-sand.

Doubtless large quartz crystals have at certain times been encountered in all of these excavations, although the one present active source is the large quarry of the Pennsylvania Glass Sand Company, located a couple of miles northeast of Berkeley Springs along West Virginia Route 38. Very Small quartz crystals are common in the joints and cracks of the sandstone, but the larger ones are not. The larger groups are found at long time intervals, often of years, in the course of the quarrying operations, and such as happen to be observed by the workers are given to the quarry superintendent and taken to the operating plant which is across the road from the quarry. There they remain until officials of the company decide what disposition is to be made of them. They are not given away, nor are they at any time offered for sale, at the crushing plant. But that they are fully appreciated and wisely used is abundantly evidenced by the testimony of the illustration accompanying this article, a photograph furnished by Professor George H. Brown, which shows the best of these specimens as mounted in his Ceramies Department at Rutgers University in New Brunswick, New Jersey.

The specimen shown in this photograph is 2 feet high, 1½ feet wide and 1¼ feet thick. The quartz crystals, which entirely cover it, have grown upon a slab of the sandstone, which evidently protruded into an open crack which was filled at the time with a saturated silica solution. The individual crystals taper about ½ inch in every three inches toward the lower end, being thus packed together in a series of radiate structures originating at points rather closely spaced. The larger crystals, which are relatively numerous, are interspersed with smaller, nearly colorless, translucent to transparent small ones, which average 1 to 2 inches high and 1 to 1½ inches thick. The larger crystals are all milky white and the largest one on this specimen is 5 inches long and 4 inches in largest diameter. The entire specimen weighs about 200 pounds.

A study of a single quartz from this locality discloses certain individual features worth recording. The prism faces, which taper toward the base of the crystal, have striations parallel to the intersection of prism and rhombohedron, but these are neither regularly spaced nor straight. The prism itself is a coarse mosaic of prism faces, interspersed with narrow depressions in which either the upper or lower rhombohedron faces are partially or wholly developed. It appears that the crystals, so far as the portions represented by the prism zones are concerned, are a composite of many smaller ones. In this portion of the crystal there is no conchoidal fracture, but only a hackly one. The terminal portions of the crystal, marked by the rhombohedron (the faces of which form what appears to be a six-sided pyramid), however, are far more regular and indicate development as an individual; and in this portion fairly good conchoidal fracture is present. The individual rhombohedral faces (r and z) are really each composed


QUARTZ
SiO_2
HEXAGONAL CRYSTALS
FROM ORISKANY SANDSTONE DEPOSIT
NEAR BERKELEY SPRINGS, W. VA.
PRESENTED TO
DEPARTMENT OF CERAMICS,
RUTGERS UNIVERSITY BY THE
PENNSYLVANIA FLINT PRINTING COMPANY
LEWISTOWN, PENNSYLVANIA
1939

of three vicinal faces which have triangular shapes, with interfacial angles of scarcely more than one degree. The three edges separating these faces are plainly visible and outline a vicinal form somewhat resembling a scalenohedron. The vertical edge extends from the summit of the crystal toward the center of the lower edge below the rhombohedron face, until it intersects the other two edges which extend out from the lower corners of the face. Each of these latter edges makes an angle of 35 degrees with the edge below the rhombohedron face. On each rhombohedron face there is an additional vicinal development which causes slight ridges outlining a series of concentric spherical triangles, whose common center is at the junction of the edges of the vicinal form, much like the ridges on vicinal faces of some fluorite crystals from England. No *s* or *x* faces (tetartohedrons) have been noted on any of these quartz crystals, nor any direct evidence that they are twinned; but some features of the fractures suggest junction lines of crystal structure extending vertically through the middle of prism faces, which would be the habit of twinning according to the Brazil law.

More specimens of this kind are in existence and have been inspected by the writer at Berkeley Springs, and others will undoubtedly be found; but most of them are too large for private collections. It seems very fitting that they are being distributed to institutions where they may be seen and enjoyed by the numerous devotees of mineralogy, both professional and amateur.

THE GEOLOGY OF TRINITY LAKE, N. Y.

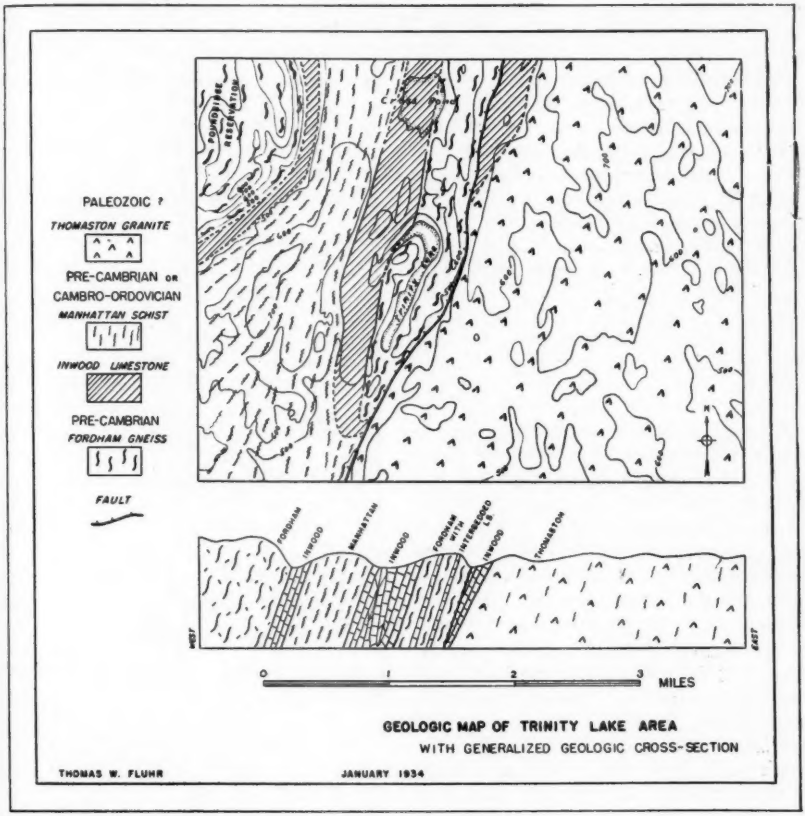
By THOMAS W. FLUHR

Trinity Lake is a small reservoir situated a short distance east of Poundridge in Westchester County, not far from the Connecticut line. It lies close to State Highway No. 124, and is crossed by the Kitchawan Lake Road and the Trinity Lake Road. Some years ago the writer visited this locality and made a preliminary map which is reproduced herewith. The geology proved to be interesting and presented more problems than could be solved in the short time available. With the lapse of time and press of other work, it has not been possible to reexamine the area in detail. Since the geologic features are both complex and instructive, and rock outcrops are abundant, it is to be hoped that some one may give this area the attention it deserves.

For many years the relations of the Fordham gneiss to the Inwood limestone and Manhattan schist formations have been a subject of scientific dispute among geologists. One group holds that the Fordham, Inwood, and Manhattan, form a continuous series, of pre-Cambrian age. Others maintain that the Inwood and Manhattan, of Cambro-Ordovician age, are a later series, deposited unconformably on the pre-Cambrian Fordham. The relations of these formations are well exposed in the Trinity Lake area, and facts can be gathered in support of both hypotheses.

The general structure of the area is that of an anticline, pitching to the south, and overturned so that all formational structures dip to the west. On the east side of the area a major fault brings in the Manhattan schist, heavily injected and soaked with Thomaston granite. The Fordham-Inwood contact is exposed in a road cut on the Kitchawan Lake Road, a short distance north of Trinity Lake, and can be traced southward.

Of major interest is the great variation in kind of rock found in each formation. The gneiss belt, for example, carries interbedded limestones, schist bands, and highly quartzose layers. The Inwood limestone carries quartzitic beds and hornblendic intrusions. At the north end of Kitchawan Lake Road, where it intersects another road, an outcrop is found, the south end of which is gneiss, while the north end is lime-



stone. The central belt of gneiss, with its schist and limestone bands, traced north toward Ridgefield and South Salem, loses these characteristics and grades into the regular well-known type of Fordham gneiss.

Those who hold with the theory that the Fordham, Inwood, and Manhattan formations are one continuous series would say that the interbedded limestones and schist of the gneiss belt are evidence of a gradational change from the Fordham to the Inwood. Those who agree with the structural theories advanced by Balk and Cloos, will see in them proof of the shearing together of the formations to a condition of pseudoconformity.

There is no doubt but that folding, faulting, and shearing have taken place in this area. In making a detailed geologic map of this area the variations in kind of rock would make it essential to record practically every outcrop, but the limited size of the area makes this possible.

GAILOR LIMESTONE QUARRY IN SARATOGA SPRINGS, N. Y.

By PETER ZODAC
Editor, Rocks and Minerals

The writer's attention to the Gailor Quarry was called by Mr. Arthur H. Jones, a member of the Rocks and Minerals Association residing in Brooklyn, N. Y., who presented him with some choice specimens from the locality. On August, 18, 1940, the writer paid a visit to the quarry accompanied by a group of collectors, Drs. L. Prescott Brown and A. C. Worth, of Albany, N. Y.; Messrs. Carl H. Klein and William Pierson, of Hudson, N. Y.; Ken Pugsley, of Pawling, N. Y.; and Nat Wolfe, of Newark, N. J.

Location

The quarry is 300 ft. west of Maple Ave., (about 500 ft. north of East Ave.) in the northern section of Saratoga Springs. The city is in about the center of Saratoga County which county is in the eastern part of New York State. Maple Avenue is U. S. Route 9 where it goes past the quarry.

Layout

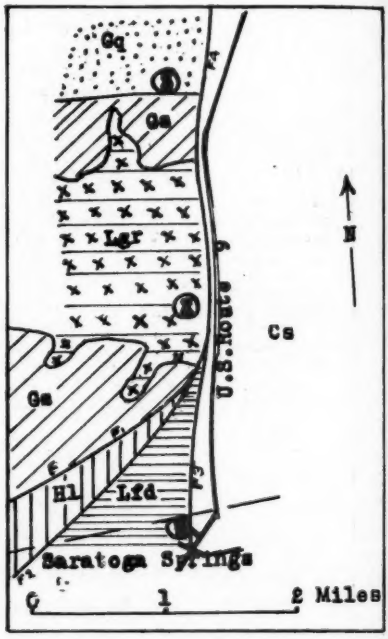
The quarry is approximately 1,000 ft. long, 400 ft. wide and 25 ft. high. All specimens found by us came from the south-central part of the quarry—no specimens were found elsewhere. In the south wall, about 100 ft. west of a fault, a small pocket was present that was lined with crystallized minerals which furnished some of our most interesting specimens. The pocket was about 12 ft. off the ground and would have been difficult to reach were it not for a small, narrow shelf 7 ft. below it.

Geology

The rock of the quarry is a dark gray fine crystalline dolomite (Little Falls dolomite of Upper Cambrian Age).[1]

Cushing[2] states: "In the Maple Avenue quarry a thickness of 22 ft. of massive beds is exposed with a dip of 5° to the southeast. The upper bed is full of chert; some of the lower beds are

1 *Geology of Saratoga Springs and Vicinity*, by H. P. Cushing and R. Rudemann. N. Y. S. Bull. 169, 1914, Geol. Map.
2 Op. cit. p. 150.



Geology of the region around Gailor Quarry

Gq—Grenville quartzite.
Gs—Grenville schists (two exposures).
Lgr—Laurentian granite gneiss.
HL—Hoyt limestone.
Lfd—Little Falls dolomite.
Cs—Canajoharie shale.
F1—Fault.
F2—Woodlawn Park fault.
F3—Saratoga fault.
F4—McGregor fault.
1—Gailor quarry (figure indistinct but quarry is just north of the word "Springs" in Lfd formation.
2—Abandoned "Belgian block" quarry on Granite Mt. in Lgr formation. Quarry can be seen from Route 9.
3—Abandoned graphite mine (Saratoga Graphite Co.) in Gq formation. A dirt road, 100 ft. north of Edgewood (tourist's house) leads to it.
(Geology is from Geological Map, Saratoga-Schuylerville Quadrangle in N. Y. S. Bull. 169.)

full of drusy cavities lined with dolomite crystals and containing crystals of clear, transparent quartz. A small fault is well shown in the quarry wall which is of interest because it seems very old. The throw is only 2 feet, but a strip of fault breccia about 6 inches wide was produced, which was subsequently solidly welded up by deposit of calcite from circulating water, so that the rock is as strong and firm as it is anywhere in the quarry."

This fault was still plainly visible in the south-central part of the quarry when the locality was visited by us and we all stopped to examine it.

Mineralogy

Aragonite: Common in the pocket in the south wall as a secondary product encrusting dolomite, calcite, rock crystals and chalcopyrite. One specimen, 4" x 2" x ¾" thick was so thoroughly encrusted by aragonite that not a single point could be seen where it had been attached to the wall. It is evident that the specimen had broken loose from the wall rock and fell to the bottom where it later became encrusted by the aragonite. Rock crystals and chalcopyrites often project through the aragonite crust but never a calcite nor dolomite.

The aragonite is grayish-white in color but most of it is stained brown by limonite. It gives the usual reactions before the blowpipe—turning white and falling to a powder—but the powder has a slightly bitter taste denoting it must contain some magnesia: evidently the aragonite has been derived from dolomite. The aragonite appears botryoidal in form but this is due to the underlying dolomite and other crystals.

Calcite: White, rhombohedral crystals associated with rock crystals on limestone. Some very pale yellow, almost transparent, cleavages have been found by Mr. Jones. Very good cleavable masses varying from colorless, translucent, to opaque white also occur.

Chalcopyrite: Very common in the pocket as small sharp crystals associated with rock crystals and dolomite.

Dolomite: Very common as small grayish crystals (crystallized) associated with calcite, rock crystals and chalcopyrite on limestone. Dolomite is the most common crystallized mineral in the quarry and it often encrusts large surfaces of the limestone.

Kaolin: Also common as grayish, earthy masses on limestone.

Limonite: Brown stains on various minerals, especially aragonite, but never in quantity to spoil a specimen.

Quartz var.Chert: Common as grayish masses which generally are picked up as loose specimens.

Quartz var.Rock Crystal: Small, doubly terminated gemmy crystals of excellent quality associated with calcite, and especially dolomite, on limestone. A group of yellowish crystals on limestone as well as some loose yellowish crystals have been found by Mr. Jones; the yellow color is due to limonite.

Acknowledgement

Thanks are due Mr. Jones for the donation of specimens and for a sketch showing how the quarry could be reached. The crystallized minerals from this quarry are of such excellent quality that they would add prestige to any collection if placed therein.

FIELD MUSEUM SENDS OUT GEOLOGICAL EXPEDITION

An expedition to various localities in Wyoming, Colorado, and South Dakota, and also in various eastern states to collect specimens relating to structural and dynamic geology left Chicago Friday, August 16. Mr. Sharat K. Roy, curator of geology, is conducting the expedition, and will probably remain in the field for about ten weeks.

The expedition is to continue field work which Mr. Roy began in 1937 and 1938. It is expected that this season's work will furnish the specimens required to fill gaps now existing in the exhibits of physical geology and lithology. A great deal of time is required in the collecting because the specimens almost always have to be chiseled out from solid rocks, and sometimes must be blasted out.

OPENING A COAL MINE

By ERIC L. ARMSTRONG

Cert. Mine Manager

Many people think that a coal mine is simply an opening in the ground in which the miner has nothing to do beyond shoveling up a lot of coal, and getting rich quickly by selling it to the consuming public at the highest possible price. Nothing could be farther from the truth.

Mining is a highly technical job, and demands a knowledge of a thousand and one subjects, of which the ordinary person would never think.

It matters not if the coal seam crops out on a hillside, so that we can tunnel directly into it; pitches or dips into the ground so that we have to sink a sloping entrance to reach it; that it is found deep in the ground to which we have to sink a shaft; the general principle of development will be the same.

Two entrances will be required. This is necessary for the purpose of ventilation of the mine. Why? The breathing of men will deplete the oxygen content of the air. Lights will absorb some of it. Gases given off by the strata will dilute the air so that it would soon be unfit to support life.

The air ontains 79% of nitrogen, and 21% of oxygen. It is the oxygen that supports life and combustion. When it is depleted beyond a certain limit neither life nor fire can continue. Air *must* be made to circulate through the mine roadways if we are to continue working the mine. Various devices are used to create a circulation.

We will suppose that you are thinking of starting a mine from a hillside, where it is possible to drive directly into the seam. If you follow what I have to say, you will see that it is almost the same thing in starting a "slope mine," or a "shaft mine."

We decide to open at a point that will allow us to dump the coal into cars, trucks, or wagons conveniently. The ground is dug away till we get a "cover" that is strong enough to allow it being timbered up, so that men can work beneath it. The method of timbering will be a matter for the miner to consider. There are many methods devised to resist the pressure of the ground under different conditions.

The two openings are commenced about sixty feet apart. They are driven parallel to each other. To set them off will require a knowledge of surveying; which may be an elementary one. When the openings have been driven in to where the ground is firm, what is termed a "crosscut" is driven from one to the other. By this means a current of air can be induced to flow through the passages made; and men can continue working without danger of suffocation.

If no explosive gas has been found in the seam, it is possible to establish a flow of air by the simple means of placing a stove, or a fire basket in the secondary opening, building a "stack" or chimney to accelerate the fire. This will create a flow of air. A short shaft may be made at a point inside the opening and the fire placed beneath it, then a tight fitting door placed at the entrance to prevent air from flowing directly to the fire, and compelling it to travel round the roadways.

When we have established a second opening which allows a circulation of air, we continue the main entrances for another sixty feet,—perhaps a hundred feet, depending on the nature of the ground, and condition of the air. At this point another crosscut is made. When it is completed we close the first crosscut by a board stopping, or by filling it across with waste rock. Doing so compels the air to travel to the second crosscut, and ventilate the advanced working.

Considerable coal will be taken out as these roadways are driven, which will find a sale and help pay the expenses of development.

If the ground is good, and the coal of good quality, we may now consider

the opening of other roads from which to secure a larger output of coal. This is where the educated miner has his say. Problems of extended ventilation will arise. Control of roof strata demands skilled knowledge. It is impossible for the layman to cope with the problems now facing us. If we consider a town in which the streets are laid off in squares, each square being a block of coal left in, and that we have to maintain a flow of air through each street, it will give a good idea of a coal mine.

The time will come when we shall arrive at the boundaries of the leased area, and then we shall commence to take the coal out of the pillars that have been left in, and allow the roof to fall behind us. When we get back to the roads and the last of the coal is won, our mine will be depleted, and no longer a source of employment or of profit to us.

So far, I have assumed we have driven into a level seam, with ideal conditions for mining it. It may happen the seam is a dipper. It may dip from a trifle up to as much as 80 degrees; or nearly vertical.

The method of development is similar. We commence by driving two slopes down on the seam. When down to where the ground is strong, we drive a crosscut in the same way as in a level seam to establish a flow of air.

At intervals decided on by the mine manager, roads are driven at right angles to the dip of the seam, to extend to the boundaries of the lease. These roads are driven in pairs, and connected by crosscuts at intervals; each being closed when another is made so as to continue the flow of air through the roadways.

When the seam dips steeply, it is usual to drive the roads a considerable distance apart, and on the boundary being reached, to take out the pillars backwards. The coal will slide to the roadway and allow easy loading. A mine having a dip of 30 degrees is an ideal one if well managed.

In the case of a shaft mine, it is first necessary to sink the shafts down to the coal seam. The direction of the roads is determined, and we then proceed exactly as was done in the other classes of mines.

So far, I have spoken of driving roads to the boundary, then extracting the pillars left on retreat. There are methods by which the whole of the coal is extracted as we go. This is again a matter for the mine manager to consider. What is feasible in one mine will not apply to another. There are too many problems in mining for the layman to solve. Hasty, and illformed judgements are to be avoided. Even the experienced manager, with a long lifetime of handling mines may be guilty of error. How much more so is the layman liable to make a mistake?

Apart from the job of handling the roof of a mine, which requires a lot of expensive timbering, we have the problem of drainage. Many mines make a lot of water, and require an expensive installation of pumps to keep the workings from being flooded. The mine manager is required to be able to calculate the flow of water into the mine, and to decide the variety and capacity of pump to handle it. Can you determine it?

Some mines give off large amounts of explosive gas. The mining laws of all countries demand that gas must be diluted to a "safe point" by a continuous current of air. Some countries demand a certain amount of air per man, and in addition a certain amount of air per horse employed. Can you determine the size of a "fan", or other ventilating appliance to be able to meet these requirements? Would you not rather leave the matter to the educated and experienced manager?

In the matter of lights for the miners to work with, much depends on the character of the mine. It is possible to work some mines with open lights. Others will require that "safety lamps" be used; unless we are looking for a disastrous explosion. Safety lamps may be "oil-burners", or "electric types." These latter are excellent to work by, but have a disadvantage in that the miner cannot detect the presence of gas by them. The

"Safety-flame-lamp" is so far the only practical means of detecting gas. In all large mines it is now customary for an official to patrol the roads and working places, having a "flame-lamp" with which to test the air for the presence of explosive gas.

The safety-flame-lamp is an ingenious affair composed of an oil vessel, fitted with a wick, the flame enclosed with a cylinder of special glass above which is a cylinder of steel gauze having 784 apertures to the square inch. This gauze is protected by an outer steel casing, with a hook handle by which the lamp is carried.

The principle that makes the lamp safe in explosive gas is simple. The gas enters the lamp with the air it consumes, and the heat is conducted away by the gauze. It acts similar to the radiator of a car in dispersing the heat. If the lamp gets too hot, and the gauze does not carry away the excess heat, the flame will pass through it to the outer air, and ignite the gas resulting in an explosion.

To detect the presence of gas in the air, the miner draws down the wick of the lamp till only a very small flame is left. Should gas be present, it will be seen burning as a "blue halo" above the white flame. The percentage of gas present can be approximately determined by the height of the halo, or "cap" (gas is often spoken of as "blue cap") as the miner terms it. Many mining countries have a law that when more than "two-per-cent" of gas is present men must be withdrawn from the mine.

To be an "examiner" in a mine, one must be a practical miner, able to determine the condition of roof, sides, and, in addition, have a sound knowledge of gases found in the mines. It is a position of TRUST, and no irresponsible person should hold it; for the lives of men, and the welfare of the mine depends on him fulfilling his duties conscientiously.

There are other problems to face the mine manager. A seam of coal is not always continuous. What are termed "faults" may dislocate the seam. The displacement may be of considerable magnitude. To determine the extent of the "throw" and it's direction is a matter for good judgement.

It costs a lot of money to drive through rock, and to relocate the seam. A mistake may be expensive to the owners of the mine. Sometimes, where several seams are found beneath each other, it will be found that a fault has brought one seam directly in line with another. In such a case, we may continue into the second seam direct. Where such is not the case, it is necessary to drive two roadways to reach the displaced seam, and practically to develop a new mine beyond the fault.

It is a mistake to think that a mine is able to produce coal once it is opened, and that expenses end with the commencement of production. Roadways have a bad habit of crushing down the timbers and reducing height. Repair men are employed to take down the roof-rock, and retimber at a height that will allow men and horses to travel. Where the roof is strong, and the coal hard, the weight of the strata will cause the road bed to heave. Trackmen have to be employed to take up the bottom, and lower the road to a working height. What is known as "Creep" may involve the whole mine; even to it's loss, if the manager cannot control it.

The handling of waste rock, retimbering of low spots, retracking, occasional falls of large amounts of material, plus taxes on the property, royalties to the State, all tend to reduce profits.

Another common mistake is to suppose the working miner is always earning large wages. There is a "rate" paid for every class of work in the mine. So much per ton for coal, so much for taking down low roof, so much for lowering and relaying track, so much per set for timbers put up, and for other jobs called for.

Some mine owners, prompted by greed, have time and again observed that the miner earned a somewhat larger wage than common labourers, and demanded a "cut", asserting they could not afford to

pay the wage earned. They overlook that "skilled workmen" usually get a higher wage than the common labourer; and the miner "must" be skilled (or get killed). They seek to degrade him to the lowest possible wage they can; and all for greater profit to themelves.

In a mine I know well, the average wage for the miners for several years has been $4.00 per day. Three men were driving a place that was exceptional. They worked like slaves to earn all possible while conditions were good. They put out 120 tons of coal in a week at 72c per ton. Because they made a higher wage than their fellows, the Company insisted they could not afford to pay such high wages, and wanted a cut of fifteen-per-cent. I have no hesitation in saying the demand was nothing less than blood-sucking.

The coal produced by this mine sells at $5.75 per ton. The average cost of production for the whole mine, including all classes of labour, and other expenses, runs to $1.50 per ton. This leaves a profit above cost of $4.25 per ton. The injustice of demanding a cut will be apparent to any normal mind. The only reason was that of degrading men for industry in their dangerous calling.

This article is not intended to be technical. It is just a casual chat on mine development, to entertain and give information on a subject that will interest all who burn coal, and who desire to know somewhat of its production. Those who wish to learn more, yet not to delve beyond their depth, will find the "Coal Miner's Pocket-book" an excellent treatise on mining technic. It may be ordered from any bookseller. The "Mining Engineer" is a small and useful magazine that reports mining matters, and carries a page of "questions and answers" for the use of students who aspire to qualify as "Mine Managers'

Editor's Note:—A pillar is a block of coal left at various intervals to support the roof in a mine. In the United States mules and not horses are generally used in coal mines.

DIAMOND CUTTING AND MARKETING ORGANIZATION TO BE ESTABLISHED IN THE UNITED STATES

The Diamond Corporation and the Diamond Trading Company, subsidiaries of the De Beers Diamond group, have announced their intention of establishing a company in the United States for the purpose of cutting, polishing, marketing, and distributing South African diamonds, according to information received in the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce, Washington, D. C., from the American Consulate General at Johannesburg, South Africa.

The visit of Sir Ernest Oppenheimer, the head of the De Beers group, and Mr. John Morrison, Secretary of the two South African subsidiaries, was planned for the purpose of forming and establishing an independent American corporation to handle the gem stones. While in the United States the address of these gentlemen will be in care of the Standard Bank of South Africa, New York City. The concern, when established, will be under American direction; its imports will consist chiefly of diamonds and brilliants in the rough.

United States Likely to Become World's Diamond Center

The elimination of Antwerp and Amsterdam as distributors, and the precariousness of the London situation, have left only two centers open to diamond purchasers—the United States and South Africa. Johannesburg's importance in the trade with the United States is growing, but it has served mainly, since the elimination of Europe and the United Kingdom, to supply the Pacific and Asiatic markets.

The establishing in the United States of the cutting and marketing company by the De Beers' subsidiaries is an important step in the general trend to make this country the world's diamond center.

Early in July the managing director of

D. Landau & Company of Johannesburg, diamond cutters and exporters, visited the United States with a view to the development of direct trade, particularly in cut stones. A large part of this concern's exports formerly went to Antwerp, Ansterdam, and London.

Diamonds Imports into the United States for Consumption.

Imports into the United States for consumption of rough or uncut gem stones during the calendar year 1939 totaled 153,982 carats, valued at $7,956,397, of which amount the Union of South Africa supplied 148,001 carats, valued at $7,656,408, and Brazil 5,846 carats valued at $292,854. During the year 60,332 carats of the cut but unset diamonds suitable for jewelry (less than 10 stones to a carat class), valued at $5,107,173, and 427,822 carats (10 or more stones to the carat class), valued at $22,310,100, were imported for consumption. Belgium and the Netherlands were the primary shippers, the former supplying 35,908 carats of the less than 10 stones to the carat class, valued at $3,116,401, and 363,898 carats of the 10 or more stones to the carat class, valued at $18,617,077, and the latter country 20,674 carats of the first group, valued at $1,313,974, and 56,748 carats of the second group valued at $3,140,231.

In the first six months of the current year imports for consumption of the rough or uncut stones totaled 58,345 carats, valued at $3,530,999; of this total 25,899 carats, valued at $1,617,703 were received in June. South Africa's participation in this half-year trade amounted to 58,196 carats, valued at $3,522,208. With the exception of 17 carats, valued at $456, which were withdrawn from bonded warehouses in June, the entire amount of rough or uncut stones imported during the six-month period entered for immediate consumption.

Total imports for consumption of the cut but unset stones during the first six months of 1940 amounted to 29,844 carats of the less than 10 stones to the carat class, valued at $2,789,512, Belgium supplying 15,236 carats, the Netherlands 4,075, the Union of South Africa 7,733, and the United Kingdom 1,445, while France shipped 1,029 carats, British India 307, Switzerland 13, and Mexico 6. During the same months a total of 171,704 carats of the 10 or more stones to the carat class, valued at $11,848,593, were imported for consumption. Of this total, Belgium supplied 139,063 carats, the Netherlands 26,257, France 2,988, the Union of South Africa 1,348, Switzerland 980, the United Kingdom 761, and Palestine 307.

Warehouse Transactions

In the six-month period under review, 4,640 carats of the cut but unset stones of the less than 10 stones to the carat group, valued at $334,556, and 6,131 carats of the 10 or more stones to the carat group, valued at $347,191, entered the country in bond (not included in the import for consumption period). Withdrawals from bonded warehouses taled 1,187 carats of the less than 10 for consumption during this period tostones to the carat class, valued at $186,564, and 3,186 carats of the 10 or more stones to the carat class, valued at $215,169 (these withdrawals for consumption figures are included in the "import for consumption" statistics previously cited). Withdrawals for export (re-exports) of the first group amounted to 128 carats valued at $9,467 and of the second group 791 carats valued at $66,076.

Axinite Found Below Sea Level

An interesting occurrence for axinite was made recently in the South Tunnel of Aqueduct Shaft No. 7, near Fishkill, Dutchess Co., N. Y., by R. Emmet Doherty, President of the Rocks and Minerals Association. The mineral occurs as crystalline masses and small brilliant crystals in calcite-filled vugs in pegmatite. The spot where the mineral was found is about 300 feet below sea level. Dr. F. H. Pough, of the American Museum of Natural History, New York City, made the identification.

An article on the minerals of this shaft is in preparation.

NEW ENGLAND NOTES

Conducted by Rudolf C. B. Bartsch
36 Harrison St., Brookline, Mass.

Boxborough, Mass. A recent visit to the old lime quarry in this little town resulted in the finding of some excellent mineral specimens. This quarry is about 8 miles from the famous Bolton locality on the road connecting the towns of Bolton and Littleton. Much of the material is similar to the Bolton minerals. The limestone is of the same coarse granular whitish calcite. It is intersected by veins of scapolite which is quite a little less colorful than the Bolton material. The actinolite is more plentiful and the blades of deep green may be found in cavities over 2 inches long. The pale blue apatite is not as plentiful. Garnet is much more plentiful but there are practically no crystals to be found as it seems to be in a fine granular state in large masses mixed more or less with granular green transparent apatite. There is however a variety of calcite at this locality which does not appear at the Bolton quarry. Beautiful specimens of massive calcite of a real orange color profusely sprinkled with small grains of green transparent apatite and small crystals of sphene may be cut from the walls of the quarry, and also by a little searching on the dumps. The outcropping ledges in the near vicinity of the main opening all clearly show the presence of this orange calcite. No crystals of this calcite have been found as far as I know. Spinel is listed by Dana as being found at this locality but no finds of this mineral have been made in recent years.

Winchester, Mass. This locality is a trap rock quarry. Considerable blasting has been done this season but the collecting on the whole has not been as good as in some previous years, but some exceptionally good specimens have been found. Babingtonite is fairly plentiful but the crystals are very small due perhaps to the narrow calcite veins in which they are usually found. Prehnite and heulandite are both found but in microscopic crystals for the same reason. Some very good crystals of feldspar have been taken out this season. A superb allanite crystal was secured by Mr. Irving of the Boston Mineral Club. It is about 2½ long by 1" x ½" thick with a very fine termination. The writer secured a few small yellow crystals of calcite in a cavity which give an excellent greenish fluorescence. Very good specimens of sphene may be found in the pegmatite veins and large masses of pyrite as well. Very few crystals of pyrite are to be found. If you notice a mass of pyrite in the pegmatite, be careful in taking it out for the sphene is close by. I have secured most of my sphene material in this way.

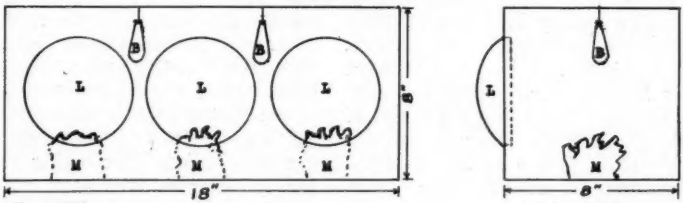
Chester, Mass. A visit to the old emery mines and their dumps is still worth while. It is true that the lower dumps have been pretty well gone over but a little extra climbing to the upper dumps and those over the crest make it well worth the effort. Some of the upper dumps had not been touched for years if ever at all. They are completely overgrown with grass and brush but the extra effort will result in the securing of many fine specimens for your collection. Many fine specimens of fresh margarite were secured as well as chloritoid, corundophilite and some diaspore. Several specimens of margarite in masses of small plates completely impregnated with chlorite were secured. The usual pink color was absent and instead a green coloration predominated so that the material did not at first appear to be margarite, but an optical examination showed its true character. No specimens of corundum were secured but there is any amount of emery to be found on all the dumps perhaps more on the lower than on the upper ones. One specimen with some kammererite was found on

(*Continued on page* 349)

COLLECTOR'S KINKS

Collectors are cordially invited to submit notes from their experiences and so make this department of interest to all.

The Cyclops Eyes



Front View *Cross Section*

B—Bulb L—Lens M—Minerals

Mr. John C. Pohl, Jr., of 204 N. 10th St., Easton, Penna., has one of the finest private mineral collections in the country. His specimens are not only of excellent quality — finely crystallized, beautifully colored, and of large size—but exceptionally well displayed. Many of his large specimens are of the rare varieties so that the collection is worth going miles to see. In addition, Mr. Pohl is a most friendly collector so that a visitor feels right at home when calling on him. He is of course a member of the Rocks and Minerals Association.

Among the many displays to be seen, the "Cyclops Eyes" is especially intriguing. This consists of a cabinet 18 x 8 x 8 inches in size (old style radio cabinet) in which three 5-inch lenses have been inserted in front and two light bulbs in back and between them. A crystallized mineral is placed behind each lens and when the lights are turned on, the crystals stand out like a house on fire.

This type of display is easy to make although some difficulty may be encountered in obtaining the lenses. The accompanying sketch shows the arrangements of lens, bulbs and minerals.

Club and Society Notes

Mineralogical Club of Hartford

The seventh field trip of the year will be held on Sunday, October 13th, at the Jinny Hill barite mine near Cheshire, Conn.

Contact Mrs. R. F. Hills, 35 Manchester Street, Hartford, Conn., (Telephone Hartford 2-1728) regarding time and place of departure.

New Haven Mineral Club

The seventh field trip of the year will be held on Sunday, October 20th, at Morris Dam, Conn.

Contact Mrs. Sadie Crowley (Telephone New Haven, Conn., 6-5900) regarding time and place of departure.

R. & M. A. TOUR

The Reading Hills Tour of the Rocks and Minerals Association which was conducted in Eastern Pennsylvania on Sunday, Aug. 25th, proved to be very successful. Upwards of 60 persons were present and good collecting was enjoyed by all.

Altho jasper was the primary interest, other minerals were found, including some of the cacoxenite and beraunite from Hellertown. One molybdenite locality near Vera Cruz proved very productive not only of the molybdenite but also splendid hornblende crystals.

Several caves were visited in the course of the day's tour and the party was finally concluded by a visit to the geology department at Muhlenberg College in Allentown where specimens of Pennsylvania minerals were distributed to members.

In general, the itinerary was an abbreviated edition of the one given in the July ROCKS AND MINERALS. Needless repetition of types was avoided in selecting jasper localities, and additional interest was added by visiting other mineral hunting grounds.

Delightful weather, which held out exactly to the last minute when the rains came, made the day all the more enjoyable.

Richmond E. Myers, Director.

. . Collectors' Tales . .

By PETER ZODAC

A Tale of a Coffee Cup

At one time I was an engineer on a large construction job in New York State. The one big item which comes to mind about this job was not the minerals collected, which included some fine jaspers and pyrites, but two engineers who were my associates. We will call one of them Otto and the other Felix.

Otto was a very fine happy-go-lucky fellow, a good engineer and liked by everyone. Felix, on the other hand, though a good engineer, was thoroughly disliked by everyone; unfortunately he was our boss and we had to get along with him to the best of our ability. Otto, however, was always playing jokes on him and getting away with it, too, as the following incidents will show.

In the early days of the job, which started in late winter, it was customary to have hot coffee during the lunch period. All but Felix chipped in to buy cups, coffee pot, coffee, sugar, etc., but—Felix always had to have his coffee!

Within a few days after we began to have coffee, Felix surprised us one lunch period by dragging out a cup with a small red ribbon tied to its handle.

"Boys," said he, "this cup with the red ribbon belongs to me."

We all stared in astonishment!

Next day when lunch period came around and we sat down for for our coffee, we found to our amazement that every cup had a small red ribbon tied to its handle. No one said a word, however, not even Felix.

A few days later Felix had another surprise announcement.

"Boys," said he, "this cup with the broken handle belongs to me."

We all looked and sure enough the handle was broken. Our cups still had the red ribbons which were badly worn and wrinkled. Again we were silent.

Next day when lunch period came around and we sat down for our usual coffee, we found to our dismay that the handle of every cup was broken. But not with even one word did anyone betray his emotions, not even Felix though he must have been boiling inwardly.

We knew it was Otto who was the cause of it all but I thought he carried the joke too far. Fortunately for us the weather soon warmed up and coffee was dispensed with; a few weeks later Felix was transferred to another office so that peace reigned supreme in our outfit.

NEW ENGLAND NOTES

(Continued from page 347)

the upper dump. Many of the wooden supports in the mine openings have rotted away and there are bad cave-ins in some of the openings and caution must be used if any attempt is made to enter the old shafts or tunnels. One tunnel was entered for about 100 feet but outside of dozens of bats nothing of any interest was observed.

MIOCENE EXPOSURE

(*Continued from page* 334)

Interesting, too, is the indurated coquina. This rock is composed of masses of shell cemented together with calcium carbonate stained by iron oxide. The calcium carbonate assuming a crystal and crystalline form, so when freshly broken the face of the rock glistens like a Christmas tree. On close examination, one can see innumerable complete crystal shell casts throughout the rock. A great deal of the rock is very compact and has in the past been extensively used for building stone.

BIBLIOGRAPHICAL NOTES

The Rock Book: By Carroll Lane Fenton and Mildred Adams Fenton.

One must not judge from the title that this is a treatise on rocks, on the contrary it has been written in popular language and is one of the most fascinating stories on the subject that has ever been printed for the general public. It also embraces ores, meteorites, minerals, and mineral collecting.

As stated on the jacket of the book, man builds rocks into houses, skyscrapers and bridges; he burns them for warmth, takes metal from them for his machines, uses them to make medicine, dyes, and ornaments, even for flavoring his food. Beyond all this, rocks tell us how the earth on which we live has come to what it is. Ancient granites trace the rise of the continents; crumpled rocks tell of mountain systems which time has worn away. Even shifting winds, currents and breaking waves are recorded on beds of stone. *The Rock Book* traces all these stories, and so describe the rocks themselves that he who studies a pebble may learn what it is and what it means. In this readable and fascinating book the Fentons combine a practical nature guide with the romantic story of the earth's surface.

The book is printed in large readable type, and beautifully illustrated. It is one of a series of books on nature. (The Nature Library) that has been issued by the publishers. Twelve books form The Nature Library; *The Rock Book* was released Sept. 6, 1940.

The book has an attractive jacket, is 7 x 9 inches in size, contains 357 pages, 48 plates, 5 full page color plates, 40 line cuts, and priced at $6.00.

Issued by Doubleday, Doran, 14 W. 49th St., New York, N. Y.

Chlorophane Near East Hampton, Conn.

An interesting occurrence of chlorophane has been found in a railroad cut near East Hampton, Conn., by Richard A. Schooner, a young member of the Rocks and Minerals Association. An article on the occurrence is in preparation and will appear in an early issue of ROCKS AND MINERALS.

Petrified Wood Near Rossville, N. Y.

A 9 lb. specimen of petrified wood was found in a large gravel pit near Rossville, Staten Isand, N. Y., by Peter Zodac, on Fri., Aug. 23, 1940, when the locality was visited with Curt Segeler, of Brooklyn, N. Y., and three members of his boy scout troop.

American Museum Lectures

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November 2
QUARTZ AND OTHER DECORATIVE STONES
Covers such materials as jasper, turquois, and lapis lazuli that are used for carved objects.
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November 9
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(Lantern Slides)